

Appl. No. 09/941,934
Amdt. dated September 3, 2004
Reply to Office action of June 3, 2004

REMARKS/ARGUMENTS

In the Office Action, the Abstract was objected to by the Examiner for including phrases that can be implied, and for using legal phraseology. The drawings were objected to because Figures 1a and 1b failed to indicate "Prior Art", Figures 2a and 2b failed to include reference characters 200 and 200', and lines and reference numerals were rough and non-uniform.

Furthermore, claims 1-9 and 33-41 were rejected under 35 USC 102(b) as being anticipated by Finnish Patent Number FI 000100133 (Ekman). The Examiner also rejected claims 1-23, 29-40 and 42 as being anticipated by U.S. Pat. No. 5,848,885 (Tanaka). Claim 42 was rejected as being obvious in view of Ekman combined with U.S. Pat. No. 4,753,286 (Herbst).

Claims 24-28 were objected to as being dependent upon a rejected claim, but allowable if rewritten in independent form.

Remarks Regarding IDS

As a preliminary matter, the Applicant notes that the Office Action received by the Applicant failed to include copies of the IDS forms initialed by the Examiner. Applicant filed a first IDS on December 10, 2001, and supplemental IDS forms on December 18, 2002, and November 4, 2003. A review of PAIRS indicates that each of these IDS submissions was received and placed in the file. Applicant respectfully requests copies of the IDS documents initialed by the Examiner, in accordance with MPEP 609 (III)(c)(2).

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Remarks Regarding Amendments

In the Specification:

Paragraph 92 has been amended to include a reference to Figure 10, and the term "radial direction" has been replaced with "direction of flow", so that the reader can correlate the text with the corresponding figures and more easily understand the information disclosed.

In paragraphs 102 and 104, the Applicant noted a few erroneous reference characters identifying certain elements in the figures. The reference characters have been corrected in the amended paragraphs 102 and 104.

In the Abstract:

The Abstract as been amended to remove the "is provided" language, as well as to replace "comprises" with "has". Applicant submits that the Abstract now complies with the guidelines set out in MPEP 608.01(b).

In the Drawings:

Applicant has submitted a fresh set of drawings on the enclosed 16 sheets. Applicant had filed replacement figures on December 4, 2002, but notes that the Examiner's report appeared to be based on the figures submitted with the application when filed on August 30, 2001. Regardless of which figures are now on file, they are to be replaced by the Figures 1a, 1b, 2a, 2b, 3a, 3b, 4a, 4b, 4c, 4d, 5a, 5b, 5c, 5d, 6, 7a, 7b, 8a, 8b, 9a, 9b, 10, 11, 12 and 13 enclosed in the Appendix.

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The replacement figures submitted herewith are of improved legibility, and, as requested, have some corrections such as the addition of the legend "Prior Art" in Figures 1a and 1b, and the addition of reference characters 200 and 200' in Figure 2a, and reference character 200 in Figure 2b. Some additional reference characters have been added to the drawings to further provide internal consistency between the drawings and the specification, without adding any new matter.

In the Claims:

Claim 1 has been amended to use language that more positively claims structural elements of the claimed invention (e.g. chambers and fluid channels, rather than simply flow paths) and to include a limitation pertaining to the relative radial extents of the diverter compared to the radial extent of the exchange media (formerly the subject matter of claim 10). In former claim 10, the radial extent of the diverter was defined as being less than the radial extent of the exchange media. In amended claim 1, this limitation has been more precisely and explicitly defined by claiming a radial extent of the diverter as being less than the functional radial extent of the exchange media, wherein the functional radial extent of the exchange media is defined by the fluid conducting area of the exchange media adjacent the fluid channels.

Independent method claim 33 has been similarly amended in paragraph (d), including the limitation that at least one fluid stream diverter be provided, wherein the fluid stream diverter has a radial extent less than the functional radial extent of the exchange media.

Claims 4, 6-8, 10, and 34 have been canceled.

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Claims 2, 3, 5, 9, 11-18, 20-24, 26, 27, 29, 31, 35, and 39-42 have been amended to correct claim dependencies and to use language that more precisely describes the subject matter of the claimed invention.

Claims 41 and 42 have been further amended to use simpler language when describing the direction of flow as being in the same direction or in the opposite direction, rather than referring to concurrent and counter-current directions.

New claim 43 includes the allowed subject matter of former claim 24, rewritten in independent form. New claims 44-46 claim the subject matter of allowed former claims 24-26.

New claim 47 includes the allowed subject matter of former claim 28, rewritten in independent form.

New independent claim 48 and dependant claims 49 and 50 have been submitted to more specifically claim the independent nature of the fluid stream diverter/housing assembly relative to the housing/exchange media casing assembly.

Applicant respectfully submits that no new matter has been added by these amendments.

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Remarks Regarding Objections to Allowable Subject Matter

Applicant gratefully acknowledges the Examiner's allowance of the subject matter of claims 24-28. Applicant has submitted herewith new claims 43-47 to claim the allowable subject matter in acceptable form.

In particular, new claim 43 contains the subject matter of former claim 24, rewritten in independent form and containing all of the limitations of the former base claim (claim 1) and all intervening claims. New claims 44, 45, and 46 have claim 43 as their respective base claim, and correspond to former claims 25, 26, and 27 which depended from former claim 24.

New claim 47 contains the subject matter of former claim 28, which depended from former claim 18 and had claim 1 as its base claim. The subject matter of former claim 28 has been rewritten in independent form in new claim 47, and contains all of the subject matter of the base claim and intervening claims.

Applicant respectfully submits that claims 43-47 are now in condition for allowance.

Remarks Regarding Rejections

The Examiner rejected claims 1-9 and 33-41 as being anticipated by Ekman. These claims (1-9 and 33-41) were also separately rejected as being anticipated by Tanaka.

Applicant respectfully submits that independent claim 1, as amended, is not anticipated by Ekman, nor by Tanaka. Claim 1 (as amended) claims an

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exchange assembly having an exchange media, a first chamber having a first fluid channel adjacent the exchange media to pass a first fluid stream through the exchange media, and at least a second chamber having a second fluid channel adjacent the exchange media to pass a second fluid stream the exchange media, the first and at least second chambers being separated by a divider. The assembly further comprises, as claimed in amended claim 1, at least one fluid stream diverter adjacent the exchange media, the at least one diverter having an adjustable orientation and providing separate flow communications through the respective fluid channels. The diverter, as claimed, has a radial extent that is less than the functional radial extent of the exchange media. Furthermore, claim 1 (as amended) includes the limitation that at any given diverter orientation, the separate flow communications are not in flow communication with the same chamber.

Applicant submits that although the text of Ekman is in a foreign language not understood by the Applicant, it is clear from the lone figure that Ekman does not teach the structure of the present application. Ekman appears to disclose an apparatus with upper and lower housings 12, 13 (respectively) on opposite sides of an exchange media having two compartments (1, 2). The upper and lower housings 12, 13 each appear to be separated into two chambers by respective upper and lower dividers 14, 15. Upper and lower rotatable discs 7, 8, respectively, are positioned between the exchange media (1, 2) and the respective chambers in the upper and lower housings 12, 13. The upper disc 7 is provided with two openings 10 in the form of pie-shaped quadrants. The lower disc 8 is provided with similar openings 11.

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Applicant submits that when the discs of Ekman are in certain rotational orientations, the opposed openings in the discs will straddle the dividers, so that each chamber (on either side of dividers 14 and 15, respectively) is simultaneously in fluid communication with both fluid streams 4 and 5. This is contrary to what is claimed in claim 1 of the present invention, namely, that at any given diverter orientation, the separate flow communications of the present invention are not in fluid communication with the same chamber.

Furthermore, it is evident that the radial extent of the discs 7 and 8 of Ekman are at least equal to or greater than the functional radial extent of the adjacent exchange media. The functional radial extent of the exchange media of Ekman is, at the very largest, defined by the diameter circumscribing the outer peripheral edges of the pie-shaped openings 10, 11. Even though the exchange media of Ekman appears to extend radially outwardly beyond the periphery of the openings 10, 11, (e.g. the outer corner portions of the media 1, 2), this area serves no purpose because no fluid stream can be directed into or out of such areas.

Since Ekman fails to teach or disclose the above elements that are claimed in claim 1 (as amended) of the present invention, the Applicant respectfully submits that claim 1 is not anticipated by Ekman.

With respect to the rejection of claim 1 in view of Tanaka, Applicant respectfully submits that Tanaka also fails to disclose an exchange apparatus with a diverter having a radial extent less than the functional radial extent of an adjacent exchange media. In Tanaka, the functional radial extent of the media 1 is defined by the inner diameter of the annular seal 18 provided between the

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changeover disc 3 and the edge of the wall formed of the casing 13b and the divider 2. As seen in Figure 2 of Tanaka, it is the inner diameter of the seal 18 that bounds the area of the adjacent media 1 available to transfer fluid flow between the media 1 and the chambers 9a, 9b, and 9c of the divider 2. In the embodiment of Figure 16, the seal 18 appears to have an inner diameter equal to that of the inner diameter of the divider 2, and so the available flow transfer area is bounded generally equally by the inner diameter of the outer ring of the divider 2 and the seal 18.

Applicant submits that in Tanaka, the radial extent of the changeover disc 3 is greater than the functional radial extent of the media 1. The changeover disc has an outer periphery with gear teeth 22 that extends well beyond the outer extent of the divider 2 and seal 18, and is exposed to provide rotational drive to the disc 3 by means of a drive gear 20. In functional terms, the radial extent must at least be equal to the inner diameter of the seal 18 so that flow is directed through the openings 4 and 5 of the disc 3, rather than around the outer edge of the disc 3. Accordingly, Tanaka fails to teach or disclose a diverter with a radial extent less than the functional radial extent of the exchange media, as claimed in amended claim 1 of the present application. Applicant respectfully submits that claim 1 (as amended) is novel over Tanaka.

Applicant notes that in the Office Action, the Examiner appears to have taken the position that a "fluid diverter (4, 5)" in Tanaka corresponds to the fluid stream diverter of the present invention, and that the radial extent of the "diverter" is defined by the "radius of the hole". Applicant respectfully submits that the reference characters 4 and 5 of Tanaka refer to fluid communicating holes (col. 12, lines 56-57). Applicant submits that the holes 4 and 5 themselves do not

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disclose the same structure and perform the same function as the fluid stream diverter of the present application. A hole is an absence matter, and as such, cannot be adjustably oriented, nor can an absence of matter provide separate flow communications to chambers through respective fluid channels, as is the diverter of claim 1 (as amended) of the present application. At page 5, line 4 of the Office Action, the Examiner identifies the radial extent of the "fluid stream diverter" of Tanaka as being the "periphery of element 3". Applicant submits that element 3 (referring to changeover means) is a more appropriate candidate for corresponding to the fluid stream diverter of the present application, but that even when so considered, Tanaka fails to anticipate claim 1 of the present application.

Applicant respectfully submits that since neither Ekman nor Tanaka discloses all of the elements claimed in amended claim 1 of the present application, claim 1 (as amended) is not anticipated by either reference and is allowable over the references.

With respect to claim 2, 3, 5 and 9, Applicant respectfully submits that these claims depend indirectly from independent claim 1 which is allowable (as argued above), and are therefore allowable in that they depend from an allowable base claim.

Furthermore, with respect to claim 3, Applicant respectfully submits that claim 3 (as amended) claims a housing having interior walls defining an inner enclosure, wherein the fluid stream diverter is provided in the enclosure. In Ekman, the discs 7 and 8 with apertures are provided between the exchange medial and the respective "housings" 12 and 13. The discs 7 and 8 are not provided in an inner enclosure within a housing.

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Similarly, Tanaka fails to teach providing a diverter in an inner enclosure of a housing. The changeover means of Tanaka is sandwiched between the casing 13b (holding regenerator means 1 and divider 2), and the outlet/inlet means 6. It appears that the Examiner is of the position that elements 13a and 13b together provide structure that corresponds to the housing described and claimed in the present invention. Applicant respectfully submits that element 13a refers to an outer cylindrical portion of the outlet inlet means 6. To the extent that 13a provides a housing, it does so only in that 13a "houses" a supply chamber 6a and an exhaust chamber 6b within the outlet/inlet means 6. Element 13b refers to a casing that "houses" the regenerator means 1 and dividing means 2. In the assembled apparatus of Tanaka, elements 13a and 13b (having respective seals 16, 17 and 18, 19) abut opposite faces of the disc-shaped changeover means 3. Applicant respectfully submits that neither elements 13a nor 13b, whether individually or in assembled form, provide a housing structure having an inner enclosure in which a diverter is provided. Applicant respectfully submits that claim 3 is allowable for this additional reason.

With respect to claim 5, applicant respectfully submits that since neither Ekman nor Tanaka provides an inner enclosure (as argued above), claim 5 is not anticipated by either reference and allowable for this additional reason.

With respect to claim 9, applicant respectfully submits that claim 9 (as amended) claims an exchange assembly having a rotatable shaft to which a fluid stream diverter is fixed. Element 31 in Tanaka refers to a fuel nozzle (see col. 11, line 45) rather than a shaft. There is no teaching that the fuel nozzle 31 of Tanaka

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rotates, or that the changeover means 3 is fixed to the fuel nozzle 31. Applicant submits that claim 9 is novel over Tanaka for this additional reason.

With respect to independent claim 33, Applicant submits that claim 33, as amended, includes the limitation that the radial extent of the fluid stream diverter be less than the functional radial extent of the exchange media, similar to that included in amended claim 1. Applicant submits that, as argued above with respect to claim 1, neither Ekman nor Tanaka discloses this limitation, and so claim 33 (as amended) is not anticipated by Ekman or Tanaka. Furthermore, Applicant submits that claim 33, as amended, includes the limitation that at any given diverter orientation, the separate flow communications are not in fluid communication with the same chamber. Since Ekman does not teach this limitation, Applicant submits that claim 33 (as amended) is not anticipated by Ekman for this additional reason.

Regarding claims 35-42, Applicant respectfully submits that claims 35-42 depend, either directly or indirectly, from independent claim 33 which is allowable for the reasons presented above. Applicant submits that claims 35-42 are therefore allowable in that they depend from an allowable base claim.

Furthermore, regarding claim 35, Applicant respectfully submits that for reasons similar to those presented with respect to claim 2 (above), neither Ekman nor Tanaka disclose a housing as claimed in claim 35, and that claim 35 is allowable for this additional reason.

Claims 10-23 and 29-32 were rejected solely as being anticipated by Tanaka. Claim 10 has been canceled. Applicant respectfully submits that claims 11-23

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and 29-32 depend indirectly from claim 1, which is allowable as argued above. Applicant submits that claims 11-23 and 29-32 are therefore allowable in that they depend from an allowable base claim.

Furthermore, regarding claim 11, Applicant submits that for reasons similar to those presented for claims 2 and 3 above, Tanaka does not disclose a housing having a connection portion and a dispersion portion as claimed in claim 11, and that claim 11 is allowable for this additional reason.

Regarding claim 14, Applicant submits that Tanaka does not disclose a housing with a connection portion and a dispersion portion, wherein the connection portion has a radial extent that is less than the dispersion portion. Even if the two housings 13a and 13b could be considered to provide structure similar to the connection portion and dispersion portions, respectively, of the present invention (the similarity being respectfully denied by the Applicant), the radial extent of elements 13a and 13b appears to be precisely equal. Applicant submits that claim 14 is allowable for this additional reason.

Regarding claim 15 (as amended), Applicant submits that Tanaka does not disclose a housing with a connection portion and an inner enclosure disposed substantially within the connection portion, as claimed in claim 14 (as amended). Applicant submits that claim 15 is allowable for this additional reason.

Regarding claim 16 (as amended), Applicant submits that Tanaka does not disclose a housing with an inner enclosure, wherein a fluid stream diverter is disposed in the inner enclosure and has a radial extent substantially equal to the

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radial extent of the inner enclosure. Applicant submits that claim 16 (as amended) is allowable for this additional reason.

Claim 42 was also rejected as being obvious in view of Ekman and U.S. Pat. No. 4,753,286 (Herbst). Applicant respectfully submits that claim 42 depends indirectly from independent claim 33, which is allowable for the reasons presented above. Applicant submits that claim 42 is therefore allowable in that it depends from an allowable base claim.

New independent claim 48 generally claims an exchange assembly with an exchange media having a casing, at least one housing attached to the casing, a fluid stream diverter disposed in the housing, and sealing means provided between the housing and the diverter. The fluid stream diverter has an adjustable orientation within the housing and cooperates with the housing to form at least two separate movable fluid channels extending between the dispersion end of the housing and ports in the connection end of the housing. The movable fluid channels provide separate flow communications between the ports and the chamber independent of the attachment of the housing to the casing.

Applicant submits that in the references cited, the "housing" must be attached to the casing in order to provide separate flow channels extending between connection ends and dispersion chambers in the disclosed exchange assemblies. This can result in a relatively complex joint interface between the housing and casing. By providing separate sealed flow channels independent of attachment to the casing, the housing with internal stream diverters can be more easily attached and detached from the casing, which can, for example, simplify replacement of the exchange media. Furthermore, the joint between the housing

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and the casing is much less complicated and easier to seal, since the joint is simply sealing two stationary items together. Applicant respectfully submits that claim 48 is allowable over the cited references, and that claim 49 and 50 are allowable in that they depend from an allowable base claim.

In view of all the above, Applicant respectfully submits that the claims presently on file are patentable over the prior art. Applicant submits that this is a complete response to the outstanding Examiner's communication and that this application is now in condition for allowance. A notice to that effect is respectfully solicited.

If additional fees are required, please charge the fees to our Deposit Account No. 02-2095.

Respectfully submitted,

CARGNELL ET AL.

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